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# Primary math teachers' perceptions toward mathematics weekly computerized test

Sirin Darmoch Nasrini

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جامعة الإمارات العربية المتحدة  
United Arab Emirates University

United Arab Emirates University

College of Education

Department of Curriculum and Methods of Instruction

**PRIMARY MATH TEACHERS PERCEPTIONS TOWARD  
MATHEMATICS WEEKLY COMPUTERIZED TEST**

Sirin Darmoch Nasrini

This thesis is submitted in partial fulfilment of the requirements for the  
degree of Master of Education (Curriculum and Instruction)

Under the Supervision of Dr. Adeeb Al Jarrah

May 2016

## Declaration of Original Work

I, Sirin Darmoch Nasrini, the undersigned, a graduate student at the United Arab Emirates University (UAEU), and the author of this thesis entitled “*Primary Math Teachers Perceptions Toward Mathematics Weekly Computerized Test*”, hereby, solemnly declare that this thesis is my own original research work that has been done and prepared by me under the supervision of Dr. Adeeb Al Jarrah, in the College of Education at UAEU. This work has not previously been presented or published, or formed the basis for the award of any academic degree, diploma or a similar title at this or any other university. Any materials borrowed from other sources (whether published or unpublished) and relied upon or included in my thesis have been properly cited and acknowledged in accordance with appropriate academic conventions. I further declare that there is no potential conflict of interest with respect to the research, data collection, authorship, presentation and/or publication of this thesis.

Student's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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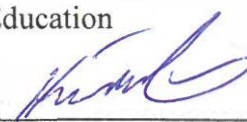
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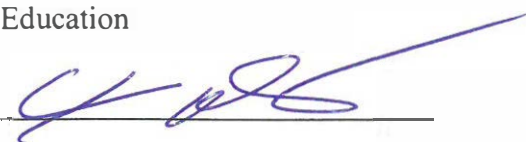
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Copy 11 of 11

## **Abstract**

This thesis is concerned with the computer base tests verses the traditional paper pencil in particular the perception of teachers toward the computer based test.

The main objective of this thesis is to examine the primary mathematics teachers' perception toward the weekly computerized tests. And how does their gender of years of experience affect their perception toward this unique type of assessment. A mixed method of quantitative and qualitative is used to find out the results. A questionnaire and an interview are the instruments used in the research. The study found out that primary teachers are positive toward the weekly computerized tests; they believe that it a better diagnostic tool than the paper pencil assessment in term of saving time, papers and in getting the needed feedback on spot. Teachers' years of experience and gender do not affect the way teachers think about the computerized tests. The way teachers think, feel, perceived and believe has an influence on the way they implement the weekly computerized test which eventually affects students' performance and progress.

**Keywords:** Weekly computerized test, primary mathematics teachers, AMS, teachers' perception, new teachers, experienced teacher.

## Title and Abstract (in Arabic)

### تصور معلمي الرياضيات للمرحلة الأساسية تجاه الاختبارات الأسبوعية المطبقة عن طريق الحاسوب (الكمبيوتر)

#### الملخص

تختص هذه الأطروحة بدراسة الاختبارات المطبقة باستخدام الحاسوب (الكمبيوتر) مقارنة بالامتحانات التقليدية المطبقة باستخدام القلم و الورقة، ولا سيما تصور المعلمين نحو الاختبار المطبق عن طريق الحاسوب (الكمبيوتر) والذي يعمل بنظام إجابة الأسئلة من اختيارات متعددة.

الهدف الرئيس من هذا البحث هو دراسة تصور معلمي الرياضيات للمرحلة الأساسية تجاه الاختبارات الأسبوعية المطبقة عن طريق الحاسوب (الكمبيوتر). ودراسة احتمالية تأثير جنس المعلمين أو عدد سنوات الخبرة على تصورهم نحو هذا النوع الفريد من التقييم.

استُخدم في هذه الدراسة المنهج المختلط (الكمي والكيفي) لمعرفة النتائج، وكانت الأدوات المستخدمة في الاستبانة والمقابلة، ووجدت الدراسة أن نظرة معلمي المرحلة الابتدائية إيجابية تجاه الاختبارات الأسبوعية المطبقة عن طريق الحاسوب (الكمبيوتر) ويعتقد معلمو المرحلة الابتدائية لمادة الرياضيات أن الاختبارات المطبقة باستخدام الحاسوب (الكمبيوتر) أداة تشخيصية أفضل من الامتحانات التقليدية المطبقة باستخدام القلم و الورقة، وذلك من ناحية توفير الوقت والأوراق، وفي الحصول على التغذية الراجعة اللازمة على الفور، كما وجدت الدراسة أن سنوات الخبرة للمعلمين و الجنس لا تؤثر على نظرتهم حول هذا النوع من الاختبارات، وإن الطريقة التي يفكر أو يشعر أو ينظر أو يرى من خلالها المعلمون الاختبارات المطبقة عن طريق الحاسوب (الكمبيوتر) لها تأثير على الطريقة التي تنفذ بها هذه الاختبارات و بالتالي تؤثر في نهاية المطاف على أداء الطلاب و تقدمهم.

**مفاهيم البحث الرئيسية:** الاختبارات الأسبوعية المطبقة عن طريق الحاسوب (الكمبيوتر) - معلمو الرياضيات للمرحلة الابتدائية - تصور المعلمين - المدرسون الجدد - المعلمون ذوو الخبرة.



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This accomplishment would not have been possible without them. Thank you.

## **Dedication**

*To my children Tala and Jad who provided me with unfailing support and continuous confidence in their mother throughout these years of study.*

## Table of Contents

Title .....	i
Declaration of Original Work .....	ii
Copyright .....	iii
Approval of the Master Thesis .....	iv
Abstract .....	vi
Title and Abstract (in Arabic) .....	vii
Acknowledgements .....	viii
Dedication .....	ix
Table of Contents .....	x
List of Tables.....	xii
List of Abbreviations.....	xiii
Chapter 1: Introduction .....	1
1.1 Introduction .....	1
1.2 Statement of the Problem .....	2
1.3 Research Questions .....	5
1.4 Purpose of the Study .....	5
1.5 Significance of the Study .....	6
1.6 Definition of Terms.....	7
1.7 Limitation.....	8
Chapter 2: Literature Review .....	9
2.1 Overview .....	9
2.2 Using Computers/Technology in the Classrooms.....	9
2.3 Computerized –Online Assessment .....	16
2.4 Conclusion .....	19
Chapter 3: Methodology .....	21
3.1 Overview .....	21
3.2 Context of the Study .....	22
3.3 Research Design.....	22
3.4 Population .....	23
3.4.1 Participants .....	23
3.4.2 Instruments .....	23
3.5 Procedure.....	24
3.5.1 Validity.....	24
3.5.2 Reliability .....	25

3.6 Data Analysis .....	25
3.7 Research Challenges and Limitations .....	27
3.8 Ethical Considerations .....	28
Chapter 4: Findings .....	29
4.1 Introduction .....	29
4.2 Data Analysis .....	30
4.3 Qualitative Data Analysis .....	36
4.4 Summary .....	40
Chapter 5: Discussion .....	42
5.1 Introduction .....	42
5.2 Discussion .....	42
5.3 Teachers' Perceptions of Weekly Computerized Test vs. Paper/pencil Test .....	42
5.4 Experience Main Effect .....	44
5.5 Gender Main Effect.....	45
5.6 Educational Implications.....	46
5.7 Implications for Theory.....	46
5.8 Implications for Primary Mathematics Teachers' Practice.....	47
5.9 Implications for Professional Development.....	48
5.10 Implications for Creating Communities that Value Weekly Computerized Test for Primary Mathematics .....	49
5.11 Recommendations for Future Research .....	49
Chapter 6: Conclusion.....	51
Bibliography.....	52
Appendix A .....	58
Appendix B .....	61

## List of Tables

Table 1: Descriptive Statistics for the Likert Scale Items related to Weekly Computerized Tests .....	30
Table 2: The Mean and Standard Deviation for the Likert Scale Items related to Weekly Computerized Tests .....	31
Table 3: Descriptive Statistics for the Likert Scale Items related to Paper/Pencil Tests .....	32
Table 4: Group Statistics Teachers' Experience .....	34
Table 5: Paired Samples Test for groups of new and experienced teachers – Weekly Computerized.....	34
Table 6: Paired Samples Test for groups of male and female teachers – Weekly Computerized Tests .....	35
Table 7: Paired Samples Test for groups of male and female teachers – Paper/Pencil Tests .....	35
Table 8: Independent Samples Test for groups of male and female teachers – Weekly Computerized Tests .....	36
Table 9: Independent Samples Test for groups of male and female teachers – Paper/Pencil Tests .....	36
Table 10: Responses to Question 1 .....	37
Table 11: Response to Question 2.....	38
Table 12: Experienced Teachers' Response to Question 2 .....	40
Table 13: New Teachers' Responses to Question 2 .....	40

## **List of Abbreviations**

ADEC	Abu Dhabi Education Council
SAT	Scholastic Aptitude Test
AMS	Academic Monitoring System

## **Chapter 1: Introduction**

### **1.1 Introduction**

Mathematics teachers try to find the best ways of assessing their students' knowledge and ability. Many of them struggle doing weekly assessments, marking them, and analyzing their results in order to plan accordingly for their next classes. Continuous Assessment leads to continuous feedback and accordingly plans. In his book Morrison illustrates the importance of assessment in the learning process, as one of the main tools of gathering accurate information from young children and takes the right decision in terms of the concepts that must be retaught and the pace of teaching that must be followed (Morrison, 2010).

When someone thinks of doing mathematic, initial thought may involve doing word problems, working with numbers to find answers, doing arithmetic number sentences and geometry problems, algebra and probability. Mathematics is often believed to have challenges to achieve planned learning outcomes especially when it is to be taught in English for students who have English as a second language. Doing math may depend on the language used, the process and the basic knowledge. Students who study math in a second language may be more concerned with getting the correct response than with the process. They may not be able to justify their answers Haynes, J (2009). Therefore, teachers must consider this factor when developing mathematic tests. On the other hand, many mathematics teachers give tests for the sake of marks/grades or as duty which complete their required assignments for their schools' administrators. While the core reason of mathematics assessment is to find out what mathematical terms students can use, their level in thinking, the concepts they understand, and the problems they can articulate. Some

scholars believe that computerized testing approach may increase knowledge sharing capacity which encourages student teaching even at home Watson, G. (2009). Clark, L. (2008) further supports that computerized learning can be of great benefit to policy makers and educators.

## **1.2 Statement of the Problem**

The research problem is based on the use of different instruments of assessment which differ from one academic institution to another, although many international standardized tests are used around the world, for example; Scholastic Aptitude Test (SAT) which is done and analyzed by educational authorities and not by classroom teachers in order to measure and compare the students all over the world. Mathematics teachers must be familiar with the structures of these tests as required by educational authorities keeping in mind they are not the ones who have set up these tests or standards. According to Adam (2005) argues that tests and assessments are the measurement tools that teachers use to measure students' progress and provide feedback to the students in order to improve their performances. The idea of this search has started from the use of the assessments in United Arab Emirates schools. The debate of using multiple choice test, computerized test or weekly test attracted the researcher interest to find out how do teachers feel about using a computerized test on weekly basis.

Abu Dhabi Education Council (ADEC) has shared all schools' inspections reports about assessments in both private and government schools. One common finding is that teachers predict grade-points averages (50-100) to their students but these grades do not yield or give any information on students' progress. ADEC is asking to move the criteria of tests toward students' measurements of what they know. Therefore, ADEC has set a clear policy for assessing students in all grades.



Where all private and government schools have to follow and adapt their assessment structures accordingly. ADEC arranges many training for Principals, Head of departments and teachers in order to explain ADEC policies in regard to assessment.

Stake holders believe that all assessments must be linked to learning outcomes that ADEC has created for each subject area and grade. However, the impact of all ADEC policies on how teachers use technology to help assessing students in mathematics is still needs to be investigated. Analyzing and generalizing the assessment component as well as characters in addition to the level of teachers' understanding and perception of all assessment theories must be subjected to further studies in order to reform the decisions and the directions in every school. Therefore the researcher will try to find out mathematics teachers' perceptions toward mathematics weekly computerized test.

The need of an efficient action toward any gap in students' learning leads to form a consistence assessment that is easy to be formed and marked. One of the most popular tests that is easy to be marked by teachers is multiple choice test, students choose one answer which is either right or wrong, steps of solving a problem are not counted in such test, and in many organizations the multiple choice test is formed on computers.

### **Weekly Computerized Test:**

The weekly mathematics test is a consistence test that runs every week under the same conditions in terms of the timing, the type of questions (multiple choices), the location of the test and the teachers who invigilate the students. This is in order to ensure that results of the test are not affected by any external factors, and that teachers can compare the results over weeks and between different sections. The

weekly computerized test assesses the basic concept students learned in previous weeks.

**Teachers:** teachers who use the weekly computerized tests can get results on the same day of the test. And they therefore can adjust their plan for the next week according to the results in terms of reteach some concepts, focus on students who are needed and/or go ahead. Teachers can consider the weekly computerized tests as a diagnostic tool to assess their students' performance and monitor their developmental needs before they get to their final test.

**Students:** students who do the weekly computerized tests get the chance to practice for the standardized assessments that are required for universities, moreover, this type of test enhance their ability to set a system of their study habits. Most importantly, students can get immediate objective feedback about their level of mastering the included material in the test, and that makes this test as an informative test.

**Parents:** parents can monitor their children' performance on weekly basis and can accordingly communicate with the relative teachers.

**Stake Holders:** administration, head of department or/and directors can study the weekly computerized tests' results which ultimately gives them the indication of the teachers' effort and ability to implement the best teaching and learning technique.

The above facts about the weekly computerized test formed the final statement of this study which is: Primary Mathematics Teachers' Perception toward the Weekly Computerized Tests. More about the weekly computerized test will be highlighted in the significant of the study.

### **1.3 Research Questions**

The current study tried to answer the following main questions:

1. What is the Primary Mathematics Teachers' perception toward weekly computerized tests in relation to the paper pencil tests?
2. What is the difference, if any, between experienced teachers and new teachers in terms of using computerized tests in order to assess mathematical knowledge?
3. What is the difference, if any, between male and female teachers in terms of their perception toward the weekly computerized tests?

### **1.4 Purpose of the Study**

Based on the above research questions, the research purpose of this study is as follows:

1. To examine teachers' perceptions toward computerized tests;
2. To examine theory perceptions regarding the differences, if any between computerized tests and traditional paper and pencil tests;
3. To examine the impact of teaching experience on the perceptions of teachers toward the weekly computerized test;
4. To highlight the impact of gender in teachers' opinion.

The study is a mixed methodology study; the researcher used both quantitative and qualitative methodology. The study has been conducted in one of a Worldwide International Network Schools. The school has 9 branches in United Arab Emirates and more than 19 schools in the Middle East, North Africa, Europe and North America following the same system. All schools in this Net-work Schools use the regular testing as method of assessing the learning process. This means that all schools use the weekly computerized test as one of their assessment tools.

The researcher tried to find out the mathematics teachers' perceptions toward the assessment form used in this Network School. The sample has been chosen from the school network in the Emirate of Abu Dhabi. All school brands follow the same system in terms of curriculum, assessment, school policy management hierarchy and school's structure. The only difference between the schools is the culture and nationality of students and teachers. Yet, the chosen samples of teachers were from the same region (Abu Dhabi) with similarity of nationality.

### **1.5 Significance of the Study**

Since that the way teachers think, feel, believe and perceive about the weekly computerized test can significantly affect their implication of the test and therefore their students results and progress, that's why finding out how do these teachers perceive it they is very important. Additionally, teachers can benefit from using the weekly computerized tests as the following:

- ✚ Teachers can use different versions of the same questions by changing the options, this minimizes the chances of cheating.
- ✚ Teachers can guaranty that less opportunities of students cheating when using the weekly computerized tests.
- ✚ Teachers can compare results over weeks as the environment of the test doesn't change.
- ✚ All schools can develop the strategies of this test to match their student needs.
- ✚ There is no enough studies about the use of the computerized test, or the weekly tests in UAEU, although there is dilemma and many criticism of this type of tests going on between schools' stake holders. This study can highlight some evidence that support the best use of this type of test. And

accordingly policy makers can indicate some specific strategies for all schools to follow in terms of using the weekly computerized tests.

On the other hand, the present study has several other important goals. It investigated the way teachers perceive about assessing their students in mathematics on weekly basis. Thus, school management, regional head of mathematics, directors and senior administrators, curriculum developers can create opportunities for teachers to be involved in professional development plan in order to increase their abilities of understanding and implementing the best assessment in their classes

Therefore this study will contribute to the knowledge base for researchers and academic institutions in the perception of computerized tests. Lastly, the current study identified issues that may arise from the perception of computerized tests which can aid in future testing and overall improvement of computerized tests.

### **1.6 Definition of Terms**

The following list of definitions will help the readers or/and reviewers to understand in what context are the terms are used in this Net-work Schools.

1. AMS: Assessment Measurement System; which is the weekly computerized multiple choice test of mathematics, where every question has 5 choices, this test assesses the basic information of each taught unit in a previous weeks.
2. Primary mathematic teachers: Teachers who teach students in grades 3, 4, 5 and 6 (ADEC policy, 2016).
3. Teachers' perceptions: the way teachers believe, think, notice or see an academic aspect.
4. Paper Pencil test: In their assessment portal manual, submitted to the University of California, Road, R .R & Monterery, A. R. (2016). Defined

paper pencil test as a summative assessment that should be formed by teachers of the same level, marked by teachers and moderated by teachers of other classes. It requires students to answer several questions with clear mathematical steps that should be marked according to a convenient rubrics. These tests should be given back after checking to the perspective relevant students.

5. New Teachers, Experienced Teachers: According to Ben Jensen, B., Hernadez, S, Andres. & Eugenio, J. (2008).New teachers are teachers who are fresh graduated. While experienced teachers are teachers who have worked in classrooms for more than 2 years and have attended to professional development training. On the other hand, in this study the researcher defined new teachers as teachers who used the weekly computerized test for only 1 year, while experienced teachers are teachers who used the weekly computerized tests for more than two years.

### **1.7 Limitation**

The researcher focused on primary mathematics teachers working in 3 schools form the 9 Net-Work School, due to the difficulties of contacting teachers in other states (Dubai, Sharjah, etc.), the researcher limited the study to the three schools in AL Ain and Abu Dhabi in order to make data collection practicable. A limitation of this study might be that participants who completed the questionnaire voluntarily. The corresponding interpretation of the item may vary among participants, moreover, since the data of the study was based on self-reported measures, the researcher considered that teachers were working in the schools at the time of the study, they might have answered in the way they thought was desired, (acquiescence bias) rather than stating their own perceptions results.

## **Chapter 2: Literature Review**

### **2.1 Overview**

When students start their learning with a clear sense of where they are heading, and when they play a role in tracking and communicating about their own progress along way, their chances of success grow amazingly. How do educators measure this success is a very important question, as any assessment can produce accurate or inaccurate information about students' achievement, they may or may not represent students' learning outcomes. One of the goals of educators is to be accurate in measuring students' learning outcomes accurately. Moreover, the needs of proficiency in assessing students' knowledge are highly important to differ the quality of teaching among the schools, colleagues, universities and colleges.

### **2.2 Using Computers/Technology in the Classrooms**

Adams (2005) suggests that using both computerized tests grading such (right-wrong) and skills checklist can motivate students to move fast to learn and pass test requirements and expectations of teachers and parents.

According to Munk and Bursuck (2001) parental involvement is an important dynamism in the development of children at school and that the computerized assessments give the parents immediate feedback about their children' involvement which assures their better contribution with teachers to the best of the students, in conclusion to their study, the computerized tests can allow parents to liaise with the students at home.

Dianne and Beth (1998) further agree that using the computerized tests has an impact in the student's learning which not only impacts school performance but also

day to day life practice as students become more organized in terms of their consistence preparation for their tests.

Pullock (2007) maintains that it is the responsibility of the teacher to identify the strength and weakness of students. According to a study conducted by Guskett (2009) teachers who took action in line with what report stated realized positive results in return. To assist children in their learning, it is very important for parents to have more information concerning their children study behavior and computerized tests can encourage such involvement.

A very comprehensive study about the computerized testing, Zhao & Bryant (2006) stated that computerized testing can help to improve students learning outcomes. Teachers' participation during class time is not enough to bring significant impact on a child's performance; as from the day a parent makes comment on his child performance he/she should be ready to

- Follow up on how his child fared for the better day in the school
- Check up the students assignment and make sure that all the assignments are done
- Make that the child frequently visits the library, museums, cultural and art events
- Take the child to program evaluation and decision making activities

Assessment should be issued more frequently during the academic year. Assessment could indicate weaknesses for students to work on. In addition, past scholars suggest having ongoing communication meetings instead of sending written comments on outstanding students on the assessment, the researchers continued by recommending that computerized tests can give information about Student's effort and work habits and ultimately makes parents' involvement more efficient. Guskett



(2009) agrees that even though parents' involvement through students' assessment has positive impact over students' outcomes, more investigations still need to be done on how this aspect can further be developed. Changing the way the assessments are designed could make great impact on the students' performance. The student's effort and work habits can be one way of changing the presentation of the report card, which all can turn to a formative assessment when using computerized assessment. Moreover, computerized assessment/tests should give information about Student's general achievement. For teachers to be able to bring amicable effects on students' performance; they must be willing to invest both their time and effort in the whole process. Schools cannot manage a student without the help of the teacher and vice-versa; reflecting the general achievement calls for active participation from both parties if the child is to succeed. Teachers should amplify the schools effort, create their own and are close companion of the school. Guskey and Bailey (2001) suggest that computerized tests can help to make this a reality.

Computerized tests give information about Student's progress on mastery of specific content.

The following summary of some studies show cases when school policy relies on only teachers' feedback in terms of students' grades:

Findings from past studies Waltman and Frisbie, (1994) evidenced that most teachers have an optimistic attitude towards assessment and evidenced that they are willing to have a clear comprehension of the contents of the assessment. Therefore the all content and not specific content should be reflected in the assessment. According to Guskey and Bailey (2001) it is important for teachers to be more aware of their children conduct, awards or improvements. Gusket (2009) argues that if most teachers were asked about their children's strength, learning attitude, moral and

personal development in relation to how it affects their school performance only a quarter of the teachers would be able to give accurate answers.

In support of this, Waltman and Frisbie (1994) agrees that three quarter of the teachers do not bother giving any explicit suggestion regarding to information provided in the assessment or the practice of grading and reporting. In their study they found out that most teachers are only concerned about giving comments/feedback on their students work, but they do not follow up to make sure that they do exactly follow the instructions in the assessment. As a reflection of teachers' judgment of students' achievement and behavior in school, grades ideally provide students with information they can use to improve their performance. But the grade teacher assigns to students don't show their real level or don't help them to improve their performance. From this point the researcher tried to investigate how do teachers feel when using the computerized tests in terms of giving objective feedback to their students.

**Weekly/weekly computerized Test:** According to Brookhart (2008), the weekly tests reflect the progress of the student's achievement; they show the level of student in percentages. Bursuck, W. D., Munk, D. D., & Olson, M. M. (1999).agreed that weekly assessment allows teachers to know about the student's levels in class and in school. Through computerized tests, teachers can monitor student's level of knowledge, power, and achievements. However, there are comprehensive searches, practices and educational theories about the use of assessment in the class.

The grade teachers assign to students also have been shown to have strong and lasting effects on students' attitudes, persistence in school, and motivation to learn factors surrounding the development and characteristic of the student should encompass the entire expectation and belief of the family both in family and school

life. In support of this, this paper suggests that a school-family relationship is necessary. Therefore the assessment should encompass planning the students after school life. Teachers help students build their future (engineer, doctors, manager, etc) through the assessment comments because the students provide it for the college applications and future job opportunities

A past study concludes that teachers' involvement through students' assessment has positive impact over students' outcomes and it has an impact on their overall outcomes Zhao & Bryant, (2006). How teachers deal and think about using technology in their classrooms is a vital factor that has been studied in many researches. Muller & Woods (2008) found in their study among 40 primary and secondary teachers that although schools have been rapidly equipped with computers and internet access, this is not an evidence of using computers effectively in practice. They have studied the potential variables that affect the implementation of using technology in the classrooms such as teachers' anxiety or technophobia. Very similarly, Cuban (2001) found that only 31% of teachers in schools well equipped with technology had modified their classrooms majorly to use the computers efficiently, in her study which accrued at Nairobi, 72 teachers formed a sample of sectional descriptive designed study. These studies were the first motivational factor for the researcher to know more about how do the new teachers and the experienced teachers feel about using computers when assessing students. As the way they perceive impact the implication of the tests.

Zhao & Bryant (2006) have examined the importance of training teachers for using technology and the impact of that on their daily practice, their study found that although elementary teachers stated that they were novice before having training where they were unwilling to try or not confident to use computers in their classes,

training alone could not help them to integrate using technology efficiency as they needed one to one-mentoring system mentoring systems, in order to help them informing administration in their schools and policy-makers in regard to provide more investments, technology support and professional development.

More studies have been conducted in United Arab Emirates, for example Ismaeil, Al Mekhlafi & Al-Mekhlafy (2010) have used a questionnaire and a focus group interview as a technique of the study. The approach of the study was a mixed of quantitative and qualitative. The sample was 621 teachers from 67 schools 5 emirates in UAE, the results showed that all these teachers were proud of their levels of using technology in their daily practices, the study highlighted the areas were teachers' perceptions of their achievement were high, such as creating multimedia presentations, creating language's labs and technology projects. There was no difference between Arabic and English teachers, except of the using technology for distance education, which got higher scale in the group of the English teachers.

Most of these teachers stressed on the importance of aligning enough time to use technology are the highest barrier of using technology, while the least one is the lack of knowledge and skills, as it could be resolved by training or attending to more development programs. Yet, English teachers clarified that as English is the second language for most of UAE students, using emails dictionaries and encyclopedias is not as used as much as it is in the Arabic language classes. That might be an additional barrier of using technology for them, as it causes negative perceptions of students toward using technology in English.

**Computerized Assessment;** with the rapid growth in the availability, friendly use and low- cost of computers the use of computers to administer test is commonly used. Actually, "Pencils down: Technology's Answer to Testing"

becomes a special educational term that has been published and used since May 2003. David, Linn, & Gronlund (2009) presented the advantages of using computers to assess students:

- Receiving results as soon as possible.
- Reducing printing papers.
- Tailoring the next item in any test according to previous item's result.
- The substantial potential for teachers for their own classroom assessments
- The ability of analyzing the results of the tests and compare it with previous and following tests.
- The accessibility way to judge the level of reliability of measurement is faster than measurements used in pencil-paper test.
- The access of using videos, stimulations, problem settings, and access the web or CDs during test timing.
- They provide the mean of going beyond the truthful recall that is sometimes exaggerated on paper-and pencils tests.
- They measure the efficiency of the solutions and the way the problems were attacked (p. 175).

Moreover, the using of computer in assessments is integration with its using as an instructional tool replaced by the early days of drill and practice instructions.

Another study has investigated the validity of replacing paper based test by computer based test, this study has been done by Piaw, Y. C (2012). He reviewed many previous studies in this field, the findings of this study were as the following: students who sit for both types of tests get very close grades, in terms of students' motivation: it is the responsibility of the instructional designer to form a high quality of computerized test in order to guarantee that the motivation of students is

not affected and it is the same as if they are tested as paper based test. Most importantly, this study has showed that results of computer based test are more consistent and stable than the paper based test. He stated that “based on the results of this study, computer based testing can be used as a valid replacement for the conventional paper based testing in educational institution.”

### **2.3 Computerized –Online Assessment**

According to Miller, Linn and Gronlund (2012), “The multiple-choice can measure a variety of learning outcomes from simple to complex, and it is adaptable to most types of subjects- matter content” (p. 196). Therefore, standardized tests use multiple-choice type exclusively. Especially that it tests the knowledge of terminology, and the outcomes at the understanding and application levels when the choices and the form of the questions are solid and formed well.

As this study is all about how do teachers feel about computerized test, where computerized test are basically built on multiple-choice questions and take the standardized test as essential type? Highlighting the advantages and disadvantages of multiple-choice test that other studies have clarified is very important. According to Haladyna (2004), “Multiple – Choice test play a vital role in measuring many important aspects of most construct. When it comes to measure cognitive skills and knowledge Multiple-Choice is the logical choice” (p. 6).

On the other hand, Bridgeman (1991) found that only essay and open-ended questions can assess productively high level of skills. The researchers believes that multiple-choice test is more reliable than essay as it is less subjective, and multiple choice tests can efficiently use time to test content and knowledge. Very similar a study conducted by Haladyna, Downing and Rodriguez (2001), suggested that performance assessment is much more beneficial for teachers to assess complex

mental abilities, especially when assessing word-problems. He added that teachers have difficulties in managing the time of testing complex levels of their students' knowledge in a sufficient time, and they need the technology support and better items format to help them achieve their targets of assessing students.

Nevertheless, some researchers such as Kastner and Stangel (2011) have highlighted the needs of using specific guideline among educators that can be used to measure the efficiency of using either multiple-choice test or constructed response; they said "that there is no consensus whether both test formats are equally suitable for measuring students' ability or knowledge" (p. 1). In their researches they mentioned the difference in scoring results among both types of tests, and they found that multiple-choice test is stricter than any other type, since other format of test does not penalize incorrect responses.

While in the multiple choice students get either full mark or zero. They similarly to other studies explained the importance of using constructed response when assessing high level of knowledge or critical thinking, yet they showed in their study the advantage of the low grading costs, reliable grading, no scoring biases, and the benefit of using short timing to assess and feedback the learner aligning with the syllabus. Their experimental study included 31 graduated students, most of them were female and they have different preference in tests, some of them preferred the essay/open ended questions and others the multiple choice test. Yet, this has no effect on their learning strategy or scores.

In their research Noyes, M. Jan & Garland, J. Kate (2008) they stated that the use of the computerized tests have been an interesting over the last 15 years since the study of Dillons (1993). They tried to investigate the equivalence between computerized test verses the paper pencil tests. This was in terms of using parapets,

the comparison of the skills (comprehension, accuracy and speed) required for reading from papers or from screen, and the practicality use of the computerized tests. The findings of this study highlighted the advantages of using the computerized test as the following:

1. Tested users can get an immediate feedback.
2. Tested users can do the tests from any place (from their homes).
3. Tested users can get used to standardization of test environment; this eliminates errors in administrating the test.
4. Less opportunities of losing marks due to lack of the hand writing.

However, the study clarified some disadvantages of using computerized test such as reading from the screen might be tiring for users. And the possibility of technical problems (test freezes, loading graphs that are needed for the tests, etc.).

#### **Gender and experience:**

Although there are not enough studies about if there is any effects of gender and years of experience on teachers' perception toward the computer based tests, Clariana, R. & Wallace, P. (2002), have examined the effect of students' gender on their attitude toward the computer based test, the findings was that the gender is not related to any differences in performance between the computer based test and the paper pencil test.

In their study, Jamil, M., Tariq, R. H., Shami, P. A., & ZAKARIYS, B. (2012). Found that there was no difference between teachers' gender in term of their perception toward the computer based test vurses paper pencil test.

According to Almekhlafi (2010) who conducted a study of 100 secondary experienced teachers (60 males and 40 females) in two model government schools in Abu Dhabi, the two schools have very good technology resources and all these



teachers have good skill in using technology, he stated that teachers with 9 years of experience are to be more likely to use technology than teachers with 20 years of experience, especially when teachers use the internet and computers in communicating with each other, school administrators and parents. His research has showed that very high percentages of teachers are highly proud of their proficiencies in using technology integration.

Most of these teachers stressed on the importance of aligning enough time to use technology are the highest barrier of using technology, while the least one is the lack of knowledge and skills, as it could be resolved by training or attending to more development programs. Yet, English teachers clarified that as English is the second language for most of UAE students, using emails dictionaries and encyclopedias is not as used as much as it is in the Arabic language classes. That might be an additional barrier of using technology for them, as it causes negative perceptions of students toward using technology in English.

## **2.4 Conclusion**

For future studies there still needs more to be done on teacher's intervention regarding to what the assessment show. Further studies should be carried out to fully bridge this gap between the two parties. However based on this research the currently system of grading and reporting should be improved in the school. This chapter evidences that teachers be involved through the computerized assessment/test feedbacks. Additionally, the assessment/test feedbacks are modified so as to allow the students to also mirror on their learning. Changing how assessment document a student performance should be considered as one major step towards education enhancement. A student learning in a school greatly depends on two aspects

1. How this particular student is graded and

2. How his grades are interpreted.

These two aspects should be considered as vital as they bring maximum effects on a students learning ability. Computerized tests can bring a significant change in learning. The present study makes several contributions from both a theoretical and practical perspective. From a theoretical stand point past studies in the field of learning such as Weekly Computerized Test have provided various frameworks to be used by teachers minimise challenges associated with the perception of computerized tests. In terms of practice, the findings of the present study will help encourage and change the perception of computerized learning positively.

## **Chapter 3: Methodology**

### **3.1 Overview**

The previous chapter discussed past studies. This chapter is presentations of the research methodology considered during data collection. According to Bryman (2008) there are mainly two research methods adopted in studies: quantitative and qualitative research methods. This study adopted a quantitative and qualitative research approach and used both interview guides and survey questionnaires as a data collection instrument. According to Easterby, Smith (2012), the use of the survey questionnaire overcomes the limitations of confidentiality because it collects unbiased and candid information. Both primary and secondary sources of data are used in this study. Secondary data is used in the literature review sections and is taken from various books, conference papers and journals.

This chapter provides information about the methods that have been used to conduct the research. Descriptions of the research design, population, participants, data collection, and a data analysis have been discussed. The purpose of this study is to examine the primary mathematics teachers' perception toward weekly tests in a network private school in UAE. The study's questions are as the following:

1. What is the Primary Mathematics Teachers' perception toward weekly computerized tests in relation to the paper pencil tests?
2. What is the difference, if any, between experienced teachers and new teachers in terms of using computerized test in order to assess mathematical knowledge?
3. What is the difference, if any, between male and female teachers in terms of their perception toward the weekly computerized test?

### **3.2 Context of the Study**

The Net Private International School has 9 brands in UAE that all follow the same curriculum contents, levels' syllabus and the same types and dates of assessments. Teachers follow same teaching methodology according to the exact same lesson plan and pacing chart, in regard to assessments. Primary students do weekly mathematics test that assesses the basic unit of information, these tests are all multiple choice and computer correctable, if students do mistakes in the test, the system on the computer gives them chances to correct their mistakes as many times as needed until the time allocated is finished, students can find out their marks/results immediately after the test, parents can check out the results through the school web.

Although teachers have no access to the questions of the tests, they get the results according to the concepts that have been tested, teachers get reports that clarify every student's result with each mistake s/he did and a comparison between sections of the same level. Teachers then get a regional report that analyzes the data and show which students dropped from previous weeks and what concepts must be retaught according to the poorly answered question, teachers then plan to close the gaps while the school administrators support the concerned/dropped students with the suitable action. These weekly tests are followed with monthly tests that have some written parts.

### **3.3 Research Design**

A mixed method design has been used for this study in order to examine the primary mathematics teachers' perception toward weekly tests. Specifically, the quantitative data will be analyzed using the various forms of descriptive statistics.

### **3.4 Population**

All Mathematics teachers in the Net-Work School in UAE are the population of this study. The population sample is 50 respondents randomly selected. The population sample of the pilot study constitutes of 10 teachers English teachers who use the same type of weekly computerized test in order to check the reliability.

#### **3.4.1 Participants**

A sample of 50 primary mathematics teachers, have participated in this study. The participants were mixed genders with different ages and years of experience. All teachers have teaching qualification degrees and are authorized by the schools stakeholders' authority (Abu Dhabi Education Council ADEC and the Ministry of Education in UAE). Although convenience sampling has been chosen in this study, the sample of the three chosen schools is representative since all teachers work in the same environment, get the same teaching development sessions and follow same schools' regulations and rules. However, out of the sample of the 50 teachers only 34 responses have been analyzed as 6 teachers have left one or two questions without answers and 9 gave two answers for a questions.

#### **3.4.2 Instruments**

In this study, an interview of 6 open ended questions has been answered by 8 teachers. And a questionnaire has been used to collect data relevant to the study's research questions. This questionnaire has had 2 main sections; each one of them covered different parts that helped answering the research questions. The first section was about the demographic data about the teachers' such as: ages, gender and teaching experience. While the second section has covered parts of the researcher's questions measuring teachers' perceptions toward the weekly tests. Teachers

perceptions about the importance of assessing students on weekly basis and the amount, if any, of pressure on teachers and students when weekly tests are running, moreover, how do teachers think about the multiple choice test as a way to minimize marking duties and getting results as soon as possible. Participants used a 5-item Likert scale to rate their perceptions with a range of (1 (strongly disagree to 5 strongly agree). The researcher developed the questionnaire which is based on the research questions and objectives. The questionnaire semi structured and fits three pages. The 43 items in the questionnaire have been clustered in two domains: Weekly computerized test (28 items) and paper pencil test (15 items), data of each clustered have been analyzed as mentioned in chapter 4.

### **3.5 Procedure**

Since the population of the schools in UAE is geographically scattered, the researcher has chosen the three closer brand schools, (Al Ain, and two schools in Abu Dhabi). Questionnaires were emailed to every Head of mathematics Department who provided hard copies to his/her perspective teacher. The researcher has collected the responses as hard copies from each school.

#### **3.5.1 Validity**

For the validity of the questionnaire to be used in the study, the researcher has established content validity by asking five members in the college of education at the United Arab Emirates University. The experts have been asked to comment on the accuracy and appropriateness of the questionnaire items and its relevance to the study purpose. Based on the experts' suggestions, the researcher made the appropriate modification.

### **3.5.2 Reliability**

The researcher has conducted an internal consistency reliability test to measure the extent to which the items clustered initially within the questionnaire were consistent among themselves. Cronbach's alpha has been used to measure the reliability of the final instrument for all items of the questionnaire (the score was 0.89) for the first domain (weekly computerized test. Score = 0.864) and for the second domain (paper pencil test. Score = 0.93) In order to further ensure reliability, a pilot study was conducted using the instruments for ten teachers from the same population (Cronbach's alpha scored 0.89).

### **3.6 Data Analysis**

- Reliability statistics (Cronbach Alpha)
- Descriptive statistics of demographic information.

A designed questionnaire has been administrated to a convenient sample from a Network Private School" population, asked them about their gender, level of education and years of experience. Upon the completion of data collection, the researcher provided data analysis appropriate to answer research questions such as Means, Standard Deviations, and Percentage. After collecting the data, the results have been analyzed by the Statistical Package for the Social Sciences (SPSS) which is software for managing data and calculating a wide variety of statistics. Moreover, the interview questions have been analyzed (percentages have been calculated for each question).

After collecting the responses from teachers, the researcher has checked if that the needed data analysis has been used in order to conduct the needed results and findings that answer the research questions. The next chapter represented the

findings and results based on the survey questionnaire and the interview questions' analysis.

For the qualitative, the researcher conducted an interview with total of 8 primary Mathematics teachers; Total of teachers = 8

Number of experienced teachers: 5 = 62.25%

Number of new teachers: 3 = 37.5%

Number of female teachers: 6 = 75%

Number of male teachers: 2 = 25%

**Quantitative data analysis;** The plan for analysis of the 43 Likert scale items included data reduction prior to the assessment of the impact of gender, years of experience, and practicality of the different assessment modes on the mathematics teachers' perceptions of the weekly computerized test. This reduction involved the disqualification of those surveys that do not meet the criteria in terms of providing answers for all the given questions. Following data reduction, a reliability test called the Cronbach Alpha was used to investigate the reliability of the questionnaire used. This has been done after the researcher got 34 completed questionnaires.

**Descriptive Statistics of Demographic Information.** The researcher used Microsoft Excel 2010 to run the descriptive statistics of the demographic information. This analysis included analyzing the responses to the section one of the questionnaire studying the demographic information of the responses to understand the distribution of the sample of respondents. With reference to the demographic backgrounds of the participants in this study, their information was considered confidential; hence, they were asked to complete the questionnaire anonymously by providing only basic information like their years of experience, education, gender, and years of experience in the current school. This has revealed that the participants



in the study were 26% males and 74% females which mean that the study is slightly biased towards females. Also, almost all of them (93%) have been working as a teacher in the school at which the study was conducted for more than two years, and only a few (7%) have been working there for one year only.

### **3.7 Research Challenges and Limitations**

The current study has a pre-determined time limit which the researcher was able to overcome through a strict timetable. The researcher conducted daily tasks based on the strict timetable for predetermined milestones. This has been done after the researcher got 34 completed questionnaires.

Descriptive Statistics of Demographic Information. The researcher used Microsoft Excel 2010 to run the descriptive statistics of the demographic information. This analysis included analyzing the responses to the section one of the questionnaire studying the demographic information of the responses to understand the distribution of the sample of respondents. With reference to the demographic backgrounds of the participants in this study, their information was considered confidential; hence, they were asked to complete the questionnaire anonymously by providing only basic information like their years of experience, education, gender, and years of experience in the current school. This has revealed that the participants in the study were 26% males and 74% females which mean that the study is slightly biased towards females. Also, almost all of them (93%) have been working as a teacher in the school at which the study was conducted for more than two years, and only a few (7%) have been working there for one year only.

### **3.8 Ethical Considerations**

The researcher was keen to abide with the ethical principles. The researcher started contacting the directors of the schools via email in order to explain the purpose of the study and to gain permission to contact and involve the teachers in the survey. Soft copy of the questionnaire has been attached with a permission form. No personal data was collected from the respondents. The researcher made sure to keep confidentiality of teachers' participation. The researcher saw it was convenient to give the interview questions to the interviewees ahead of time.

## **Chapter 4: Findings**

### **4.1 Introduction**

This chapter represents the findings of the current study which was designed to investigate the primary mathematics teachers' perception toward the weekly computerized tests. The design of the current study was established to address the study's following main questions:

1. What is the Primary Mathematics Teachers' perception toward weekly computerized tests in relation to the paper pencil tests?
2. What is the difference, if any, between experienced teachers and new teachers in terms of using computerized test in order to assess mathematical knowledge?
3. What is the difference, if any, between male and female teachers in terms of their perception toward the weekly computerized test?

In order to answer the research questions, the researcher had used a combination of both the quantitative and qualitative approaches. Firstly, a questionnaire has been developed and sent to three brand schools from the Net-school to be answered by 70 mathematics teachers. However, only 50 responses were received, however 34 of these responses have been analyzed as some teachers left some questions without answers or gave 2 answers to the same question. The total response rate of 48.6%. The questionnaire was divided into 2 sections. The first section consisted of demographic information that did not reveal any personal information where the responded was asked to choose the suitable choice from the given. The second section consisted of the main survey questions totaling to 43 questions designed using the Likert scale of 1 to 5 in which (1) means strongly agree

and (5) means strongly disagree. Secondly, an interview guide consisting of 6 main questions had been developed and utilized for the same purpose. These were sent to eight respondents and analyzed in order to support the previous data.

## 4.2 Data Analysis

The data have been clustered in two domains: 1) weekly computerized test and 2) paper pencil test. Each one of the domains contained the questions related to its title. The analysis of data in this study was divided into:

- 1- Quantitative data analysis
  - Descriptive statistics of responses to section 2
  - Independent sample t-test
  - Paired sample t-test
- 2- Qualitative data analysis

### Descriptive Statistics of Responses to the Likert Scale Items;

The researcher used a combination of IBM – SPSS version 20 and Microsoft Excel 2010 to run the descriptive statistics of the responses to the Likert scale items. This analysis included analyzing the responses to the section two of the questionnaire studying mathematics teachers' perceptions to the weekly computerized test. As seen in the below table, the maximum and minimum were 116.00 and 65.00 respectively while the mean of the responses was 101.82 and the standard deviation was 13.83.

Table 1: Descriptive Statistics for the Likert Scale Items related to Weekly Computerized Tests (n=34)

	Minimum	Maximum	Mean	Std. Deviation
Weekly Computerized Test	65.00	116.00	101.82	13.83
Valid n				

**1) What is the Primary Mathematics Teachers' perception toward weekly computerized tests?**

As shown in table (5) below; teachers' perception toward the weekly computerized tests is positive in general. The notions to which they have strongly agreed were that (1) weekly computerized tests give teachers accurate data about the weekly taught concept and that (2) weekly computerized tests help students practice essential concepts on a weekly basis with means of 4.56 and 4.47 respectively. On the other hand, they have not strongly disagreed to any notion. Nonetheless, they have been mostly "less positive" about the following notions; (1) Teachers should invigilate their corresponding students during the test and that (2) Weekly Computerized Tests is not affected by the students' level of using computer with means of 2.53 and 2.97 respectively. Moreover, their mostly neutral results shown in table (6) support the hypothesis of their preference of weekly computerized tests over paper/pencil tests.

Table 2: The Mean and Standard Deviation for the Likert Scale Items related to Weekly Computerized Tests (n=34)

	Mean	SD
1. Should be developed by the relevant respective teachers.	3.68	1.01
2. Teachers should invigilate their corresponding students during the test.	2.53	1.50
3. It gives teachers accurate data about the weekly taught concept.	4.56	.66
4. Gives teachers chance to plan for following week according to the results.	4.06	.81
5. Helps students to practice the essential concepts on weekly basis.	4.47	.62
6. Makes the comparison between sections of the same grade fair.	4.06	1.04
7. Gives students chances to improve every week.	3.76	1.08
8. It is not affected by the students' level of using computer.	2.97	1.38
9. It allows teachers to measure the progress of their students every week.	4.12	1.12
10. Minimizes the chance of cheating.	3.76	1.28
11. Focus on learning not on testing.	3.03	1.19

12. Allows students to practice variety of questions within the time allocation.	3.88	.84
13. Gives an objective idea about the students' progress before doing the final test.	3.82	.90
14. Allows teachers to adjust their pace from year to year.	3.32	1.15
15. It is a good tool to be used in teachers' evaluation	3.38	1.35
16. Motivates the students.	3.82	1.11
17. Improves students' skills in handling the tests independently.	4.12	1.09
18. Teachers can spot students' individual mistakes.	4.18	1.17
19. Teachers are aware of the common mistakes and accordingly can warn their students before the test.	3.94	1.18
20. Teachers can read and conclude the results of the weekly computerized test more objectively than new teachers.	3.71	1.03
21. Teachers know the repeated questions from previous years and train students on them.	3.47	1.02
22. Students of experienced teachers get higher results than students of new teachers in the weekly computerized test.	3.29	1.12
23. Teachers are more positive toward weekly computerized test.	3.53	.71
24. Teachers feel under pressure because of the comparison between results of each teacher.	3.53	.86
25. Teachers need intensive special training on using the computerized test.	3.21	1.01
26. Teachers' perceptions toward the weekly computerized test affect their students' results.	3.15	.93
27. Doesn't help teachers to improve their skills in forming questions.	3.00	1.02
28. New teachers face more challenges in adjusting their pace in teaching according to the weekly results.	3.47	1.02

Table 3: Descriptive Statistics for the Likert Scale Items related to Paper/Pencil Tests(n=34)

	Mean	SD
29. Teachers should write the weekly paper/pencil exam in order to assess their students' weekly progress.	3.21	1.25
30. Using the paper/pencil exam helps teachers spot their students mistakes.	3.62	1.07
31. Using paper/pencil exams helps students practice answering questions in different ways by following mathematical steps.	3.76	1.10
32. Using paper/pencil exams prevents students guessing the final answers.	3.85	1.18
33. Using paper/pencil exams give students more chance to get sub-marks for each question.	3.62	1.30

34. Using paper/pencil exams makes students aware of the marking scheme/procedure.	3.91	1.22
35. Using paper/pencil exams gives teachers accurate idea about students' mistakes.	3.79	1.23
36. Using paper/pencil exams improves students' scores.	3.47	1.24
37. During paper/pencil exams students might have chances to cheat.	3.12	1.23
38. Open ended questions with steps to solve, can be used only in paper/pencil exams.	3.41	1.13
39. Marking paper/pencil exams takes long time from teacher.	3.94	1.10
40. Teachers can give individualized feedback for their students when using paper/pencil exam.	3.56	1.28
41. Using paper/pencil exams increases students' motivation.	3.35	1.12
42. Teachers can control the time allocated for each question when using paper/pencil exam.	3.35	1.15
43. Paper/pencil exams are difficult to be formed and checked on weekly basis.	3.82	1.31

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**2) What is the difference, if any, between experienced teachers and new teachers in terms of using computerized test in order to assess mathematical knowledge?**

The first factor affecting participants' responses was the number of years they had worked as teachers in the school under study. Teachers' preference of weekly computerized tests over paper/pencil tests is evident whether they were new or experienced. The means of new teachers who preferred the first over the latter were 109.71 to 96.30 which is evident in tables (4) and (5). The same tables show the similar case of experienced teachers' means which were 109.71 to 96.30. According to tables (8) and (9), those who have only been in the school for one year had a t-value of 0.44 in preference of weekly computerized tests as compared to -0.84 for paper/pencil tests. On the other hand, those teachers who had been in the school for 2 years or more had provided mostly positive responses to the survey with a t-value of 0.80 for weekly computerized tests and as low as -2.30 for paper/pencil tests. Moreover, the two-tailed significance value was 0.67 and 0.53 for those with one

year and those with two or more years of experience in the current school respectively for weekly computerized tests while it is only 0.41 and 0.10 respectively for paper/pencil tests. However, there is no significant differences between new and experienced teachers' perception toward the weekly computerized tests.

Table 4: Group Statistics Teachers' Experience

	Total Years Of Experience	N	Mean	Std. Deviation	Std. Error Mean
Weekly	1	20	96.30	15.72	3.52
Computerized Tests	2	14	109.71	3.173	.85

Table 5: Paired Samples Test for groups of new and experienced teachers – Weekly Computerized

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Weekly Computerized Tests	Equal variances assumed	21.38	.000	-3.13	32	.004	-13.41	4.28	-22.13	-4.69
	Equal variances not assumed			-3.71	21.17	.001	-13.41	3.62	-20.93	-5.89

### 3) What is the difference, if any, between male and female teachers in terms of their perception toward the weekly computerized test?

The gender of the participating teachers only affected their responses minimally. This is to say according to table (6), the means for males and females



were 99.63 and 102.50 respectively for weekly computerized tests. The insignificance continues in paper/pencil tests as per table (7) where the means of males and females are 52.50 and 54.19 respectively. This is also reflected in tables (8) and (9), there is no significant difference between the two groups since the t-value is -0.51 and -0.50 for males and females respectively for weekly computerized tests and -0.33 and -0.34 respectively for paper/pencil tests. Furthermore, the two-tailed significance was 0.62 and 0.63 for males and females respectively for weekly computerized tests and 0.75 and 0.74 respectively for paper/pencil tests. As obvious, the difference is only 0.01 in both cases which is statistically insignificant.

Table 6: Paired Samples Test for groups of male and female teachers – Weekly Computerized Tests

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	8	99.63	14.31	5.06
Female	26	102.50	13.89	2.72

Table 7: Paired Samples Test for groups of male and female teachers – Paper/Pencil Tests

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	8	52.50	11.90	4.20
Female	26	54.19	13.03	2.56

Table 8: Independent Samples Test for groups of male and female teachers – Weekly Computerized Tests

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.45	.51	-.51	32	.62	-2.88	5.66	-14.39	8.64
Equal variances not assumed			-.50	11.38	.63	-2.88	5.75	-15.47	9.72

Table 9: Independent Samples Test for groups of male and female teachers – Paper/Pencil Tests

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.17	.69	-.33	32	.75	-1.70	5.17	-12.23	8.84
Equal variances not assumed			-.34	12.65	.74	-1.70	4.92	-12.35	8.97

### 4.3 Qualitative Data Analysis

In order to further support and enrich the results of the quantitative analysis answering the research questions through a mixed method design, the researcher used six open-ended and one commentary questions. The results of the open-ended questions of the interview guide were trimmed down and clustered in the following tables. Although the respondents' answers did not generally result in a rigorous

qualitative data set, they provided the researcher with some quotes that helped in validating and elaborating on the quantitative findings of this study.

**1) What are the Primary Mathematics Teachers' perceptions toward weekly computerized tests?**

Table 10: Responses to Question 1

Theme	Responses
What are the primary mathematics teachers' perceptions toward weekly computerized tests?	<ul style="list-style-type: none"> <li>✓ The AMS is a good tool of assessing my students.</li> <li>✓ According to the results we can plan for the next week.</li> <li>✓ Actually all teachers (100%) rated the weekly computerized tests as a good assessment tool.</li> </ul>

As per to table (10), teachers illustrated that they think that the computerized weekly test is a good tool of continuous assessment that they use as formative assessment to measure their students' progress on weekly basis. It is noteworthy that female and male teachers have the same common answers. And both new and experienced teachers have given positive responses about the weekly computerized tests.

Table 11: Response to Question 2

Theme	Responses
What are the advantages of using Mathematics Weekly Computerized Tests?	<ul style="list-style-type: none"> <li>✓ It gives me a quick feedback which allows me to know my students level.</li> <li>✓ We know what we need to revise in the next week.</li> <li>✓ Gives the parents chances to know their students' performance.</li> <li>✓ AMS makes students study well and practice the type of the test before the final.</li> <li>✓ AMS forces students to study and makes us follow the pacing chart accurately.</li> <li>✓ It shows student effort. Makes my students study.</li> <li>✓ AMS makes us teach the needed material.</li> <li>✓ It helps us to know who are the weak students and work with them.</li> </ul>

Actually, the above table (11) supported the findings of the quantitative analyses, that teachers have positive perception toward the weekly computerized test (the first research question). Although teachers have declared some disadvantages of using the computerized test, they still prepared it more than the paper pencil test. For example some of them said that “Students guess the answer or skip questions” and “We can’t identify the steps that students follow.” however, they can follow the performance of their students through the discussion of the test questions after they get the results. However, the three new teachers think that their students’ ability of using computers affects their performance. That indicated that new teachers are not as positive as the experienced teachers are!

**2) What is the difference, if any, between using computerized or paper/pencil tests as perceived by mathematics teachers?**

All teachers have been directly asked the above question, they did not list differences, and however, they have listed the disadvantages of using the weekly computerized tests as the following:

- Puts pressure on teachers to finish the materials.
- The comparison between teachers is not fair.
- Students guess the answer or skip questions.

Experienced teachers commented that these disadvantages can be eliminated by revising the poorly answered questions with the students after the test is done, and through discussing the tricky possible choices that could have confused the students. This should be planned sufficiently by the class teacher. On the other hand, new teachers agreed that they have no time to revise the poorly answered questions or to solve more questions that are expected for the weekly tests. Moreover, 7 of them stated that they prefer the weekly computerized test while the eighth teacher stated that “We need to use both types of test, because we need to give individual feedback to our students”.

**3) What is the difference, if any, between experienced teachers and new teachers in terms of using computerized test in order to assess mathematical knowledge?**

This interview question has 2 different responses, as the majority of the teachers think that there is no differences between new and experienced teachers, yet some of them stated that new teachers might have a lack of expectations of the types of choices that are used for the questions, the language that is used in the body of the question and the time allocation should be used to cover the gap of information after the test is done.

Table 12 : Experienced Teachers' Response to Question 2

Theme	Responses
What is the difference, if any, between experienced and new teachers in terms of using computerized tests to assess their students' knowledge?	✓ No differences. However, new teachers are more motivated to praise their students when they get good results in the AMS

Table 13: New Teachers' Responses to Question 2

Theme	Responses
What is the difference, if any, between experienced and new teachers in terms of using computerized tests to assess their students' knowledge?	<ul style="list-style-type: none"> <li>✓ New teachers have no access on the repeated questions from previous years.</li> <li>✓ New teachers don't have time to revise before the AMS.</li> <li>✓ New teachers need more support in terms what concepts must be retaught according to the results of the AMS</li> <li>✓ New teachers feel that their results should not be compared with the results of the experienced teachers.</li> </ul>

#### 4.4 Summary

The sampling techniques, instrumentation, and data collection methods in this study were designed to probe the perceptions of mathematics teachers on using weekly computerized tests for assessment. The Cronbach Alpha test was used to investigate the reliability of the employed questionnaire. The researcher then conducted a descriptive analysis of demographic information followed by a descriptive analysis of responses to the Likert items and a t-test for the statistically significant results in order to answer the research main question and the subsequent ones:

- 1) What is the Primary Mathematics Teachers' perception toward weekly computerized tests in relation to the paper pencil tests?
- 2) What is the difference, if any, between experienced teachers and new teachers in terms of using computerized test in order to assess mathematical knowledge?
- 3) What is the difference, if any, between male and female teachers in terms of their perception toward the weekly computerized test?

Through the researcher's attempt to answer the first question, results showed that most teachers were more positive about using weekly computerized test than using paper/pencil tests.

Findings of the second question revealed that, as it was hypothesized, there were minor differences in the perceptions of weekly computerized tests between experienced and new primary mathematics teachers.

For the third question, results showed no effect for the gender of primary mathematics teachers on their perceptions of weekly computerized tests.

A review of the findings from the study, analysis of the data, conclusions, discussions, and recommendations are presented in chapter 5.

## **Chapter 5: Discussion**

### **5.1 Introduction**

This chapter provides (1) a thorough discussion of the results including the relationship of the study to prior research including the gender main effect, the education main effect, and the experience main effect on the perceptions of primary mathematics teachers about weekly computerized test, (2) research implications, and then the research wraps up the chapters with (3) recommendations for future research that would further investigate the validity of the proposed ideas and finally (4) the conclusion.

### **5.2 Discussion**

The discussion section was organized based on the design of this study, which is mixed methodology/ triangulation design. It required that the qualitative results are used to support the quantitative ones. Accordingly, the researcher integrated the results of the interview guide within the results of the questionnaire employed for the purpose of this study.

### **5.3 Teachers' Perceptions of Weekly Computerized Test vs. Paper/pencil Test**

The results of the analysis of the first question in this study indicated that teachers generally prefer using computerized test over paper/pencil test. For instance, when teachers were asked about whether they prefer conducting computerized test over paper/pencil test in the open-ended questions as part of the interview guide, the majority responded saying "AMS". Nevertheless, one of the eight teachers stated: *"Both, because we need to give individual feedback to our students."* and *"Both, because some students do better on paper/pencil tests."* On their perceptions of the



advantages of weekly computerized test teachers' responses included "*It gives me a quick feedback which allows me to know my students level.*", "*AMS makes students study well and practice the type of the test before the final.*", and "*It helps us to know who are the weak students and work with them.*" This comes in support of the results of the study David, Linn, & Gronlund (2009) which had presented the advantages of using computers to assess students: receiving results as soon as possible, reducing printing papers, tailoring the next item in any test according to previous item's result, the substantial potential for teachers for their own classroom assessments, the ability of analyzing the results of the tests and compare it with previous and following tests, and the accessibility way to judge the level of reliability of measurement is faster than measurements used in pencil-paper test, etc. Furthermore, on their perceptions of the disadvantages of weekly computerized tests, teachers' responses included "*The comparison between teachers is not fair.*", "*Students guess the answer or skip questions.*", "*Students do AMS Math, English, Arabic, and Science which is too much for them.*", and "*Students have no records of mistakes to be revised before final.*"

The results of the current study are highly consistent with the results of the study by Haladyna (2004) which has proven that "Multiple – Choice test play a vital role in measuring many important aspects of most construct. When it comes to measuring cognitive skills and knowledge, Multiple-Choice is the logical choice". On the other hand, Bridgeman (1991) found that only essay and open-ended questions can assess productively high level of skills. The researchers believes that multiple-choice test is more reliable that essay as it is less subjective, and multiple choice tests can efficiently use time to test content and knowledge. The results of the current study do not support this study as the advantages perceived by teachers outweigh the disadvantages with respect to conducting weekly computerized tests for

primary mathematics. This could be attributed again to the old date of the study by Bridgeman as the current study took place 25 years after it which means that a lot of things have changed whether in technology or pedagogy.

#### **5.4 Experience Main Effect**

Quantitative results of the questionnaire completely supported the hypothesis, as there is a significant main effect by the total number of years of experience regarding teachers' perceptions of weekly computerized tests for primary mathematics. Moreover, the qualitative analysis supported the qualitative results. The analysis of the responses to the open-ended questions in the interview guide has revealed that the perceptions of teachers were mostly positive. Nevertheless, two responses agreeing with the hypothesis were "*New teachers are not familiar with the type of questions – choices*" and "*Experienced teachers can expect the questions of the weekly computerized tests, although they don't write them.*". This is consistent with the studies of Hardley & Sheingold (1990), Sandholdz (1993); Becker (1994); Anderson (1997) and Becker & Ravitz (2001) which have proven that how teachers feel, think, believe and consider using computers are the major factors that affect the whole procedure of using technology

The results of the current study are further in support the results of the study by Yuen and Ma (2001) which showed that it is teachers' experiences more than beliefs that control the efficiency of using technology in the classrooms. However, it contradicts with the results of the research by Zhao & Bryant (2006) which revealed that training alone could not help teachers to integrate using technology efficiency as they needed one to one-mentoring systems in order to help them in informing administration in their schools. This contradiction could possibly be the result of the time difference between the study by Zhao & Bryant (2006) and the current one

(2016). This is to say, the earlier study was done in a relatively early stage of emergence of technology into the classroom which has a negative effect on teachers' mastery of the methods of using computers for teaching purposes.

### **5.5 Gender Main Effect**

The results for the analysis of the data were consistent to an extent with the studies by Clariana, R. & Wallace, P. (2002) and Jamil, M., Tariq, R. H., Shami, P. A., & ZAKARIYS, B. (2012). These results showed that the perceptions of both male and female teachers were mostly positive towards weekly computerized tests. Although the current study was an exploratory one about teachers' perceptions and no treatment took place, there were no statistically significant gender differences between males and females concerning their perceptions of weekly computerized test for primary mathematics. In fact, both genders tend to agree on the techniques of weekly computerized test. Nevertheless, they do disagree – insignificantly – on other aspects like the pre-requisite skills for conducting weekly computerized tests and their purpose. One probable reason for this statistically insignificant disagreement could be that teachers of different genders teach students of different genders as well, and students' gender might be one of the factors that affect teachers' perceptions of the aforementioned.

Not having gender differences in teachers' perceptions of weekly computerized test in primary mathematics does not necessarily mean that teachers prefer paper/pencil tests only or computerized test only. Rather, it indicates that both male and female teachers participating in the current study have had similar perceptions of weekly computerized test. For example, many teachers responded to

open-ended question targeting their perceptions about the tests under study as “*It’s a good tool*” or “*It’s a good test*”.

As for gender differences, the findings of the current study highlighted a number of differences between males’ and females’ perceptions of weekly computerized test. This is to say, males additionally disagreed to that computerized test aren’t affected by students’ mastery of computer skills, students’ performance is affected by their teacher’s perceptions of the test, and that students get chances to cheat on a paper test respectively. On the other hand, females disagreed to that weekly computerized test focus on learning not testing. Nevertheless, they both believe that teachers should not invigilate their corresponding students during the test.

### **5.6 Educational Implications**

The findings of this study were believed to be important as they revealed how primary mathematics teachers perceive weekly computerized tests. Moreover, findings from this study support the need for further exploration into how to support the implementation of weekly computerized tests in primary mathematics classes. Accordingly, the researcher of the current study had drawn down some implications for; theory, primary mathematics teachers’ practice, professional development, and implications to create communities of practice that value weekly computerized tests for primary mathematics.

### **5.7 Implications for Theory**

This study found that weekly computerized tests are beneficial for students’ learning of mathematics in the primary school as perceived by teachers in three schools in Al Ain and Abu Dhabi. According to David, Linn, & Gronlund (2009), the

advantages of using computers to assess students include: receiving results as soon as possible, reducing printing papers, tailoring the next item in any test according to previous item's result, the substantial potential for teachers for their own classroom assessments, the ability of analyzing the results of the tests and compare it with previous and following tests, and the accessibility way to judge the level of reliability of measurement is faster than measurements used in pencil-paper test, etc.

The study by David, Linn, & Gronlund (2009) suggested that using computers to assess students is advantageous. Accordingly, the findings of this study implied that teachers have positive perceptions towards the weekly computerized tests for primary mathematics. This provided support for the aforementioned study. The current study also implied that there were no statistically significant differences between the perceptions of male and female primary mathematics teachers towards weekly computerized tests which was in support of the study AlMekhlafi (2010). Finally, the results of the current study implied that teachers' perceptions of weekly computerized tests for primary mathematics are affected by their experience. This came in support of the studies of Hardley & Sheingold (1990), Dwyer, Ringstaff, & Sandholtz (1991); Becker (1994); Anderson (1997) and Becker & Ravitz (2001) which have proven that how teachers feel, think, believe and consider using computers are the major factors that affect the whole procedure of using technology.

### **5.8 Implications for Primary Mathematics Teachers' Practice**

One of the major implications of this study might be the adoption of effective practice by primary mathematics teachers who should use specifically tailored strategies to enhance their students' performance in weekly computerized tests. Students could benefit if mathematics teachers provide them with sufficient knowledge and skills that allow them to answer mathematical multiple-choice

questions through using online games, educational websites, teaching and learning programs and applications, and the several technological pedagogies for teaching mathematics. This is in addition to transmitting the teachers' positive attitude towards the weekly computerized tests and their perceptions to students. This is essential as proven in the study by Zhao & Bryant (2006) which concluded that teachers' involvement through students' assessment has positive impact over students' outcomes and it has an impact on their overall outcomes and the study by Muller and Woods (2008) which concluded that how teachers deal and think about using technology in their classrooms is a vital factor.

### **5.9 Implications for Professional Development**

In addition, this study showed that teachers' experience played a huge rule in changing their perceptions towards weekly computerized tests. Accordingly, to help new primary mathematics teachers master the preparation of students for the same, it is crucial to provide them with opportunities to support their understanding of weekly computerized tests and techniques of putting questions and answering them. To overcome the challenges perceived by new primary mathematics teachers with respect to weekly computerized tests, this study implies that there is a need to equip teachers with a practice of teaching strategies in mathematics meaning the preparation of students. When working with the teachers, it is important to provide time to learn about and practice the identifying features of weekly computerized tests. When designing professional development for primary mathematics teachers, it is important to include explicit instruction and sufficient practice in looking at weekly computerized tests for how to develop practice for students inside the classroom.

### **5.10 Implications for Creating Communities that Value Weekly Computerized Test for Primary Mathematics**

It is of great importance to develop communities of learning that allow students and teachers to meet together in discipline related teams to think about weekly computerized mathematics test and their significance to students' learning. For example, they can meet to discuss some of the past tests questions and consider how to help students understand the questions and answer them. This study implies that the mathematics lead teacher, academic vice principal, and school principal should create opportunities during mathematics departmental meetings to allow mathematics teachers to openly share struggles and successes in preparing primary students for weekly computerized tests. This can be helpful as it would develop a support system for mathematics teachers to reveal ideas and give one another confidence to continue to apply strategies. This is to say, if one teacher struggled with implementing a certain strategy and reported it to the group, another teacher would offer an approach into another way to implement the strategy. Setting up a place where teachers could collaborate with one another can make an impact on the mathematics teachers' use of shared ideas and resources. Creating communities of practice that value weekly computerized test for primary mathematics can scaffold how to better help improve attainment in the same.

### **5.11 Recommendations for Future Research**

Although this study supported the value of exploring primary mathematics teachers' perceptions of weekly computerized tests, much research is still needed. Accordingly, the researcher of this study comprised the following list of recommendations for future research:

- 1- The study employed a purposive sample from three Net-schools in the cities of Al Ain and Abu Dhabi which may have affected the generality of the findings. It would be recommended if another study can employ a random sample of participants to be collected from a wider scope of schools to guarantee that results can be efficiently generalized.
- 2- The current study focused on the perceptions of primary mathematics teachers towards weekly computerized tests, but did not investigate students' perceptions of the same. Therefore, it is recommended if another study can explore the perceptions of students towards weekly computerized tests.
- 3- It is recommended if a future study would target a comparison between students' and teachers' perceptions towards weekly computerized tests.
- 4- It is recommended if a future study would target parents' perceptions of weekly computerized tests.



## **Chapter 6: Conclusion**

In his book, Morrison illustrates the importance of assessment in the learning process, as one of the main tools of gathering accurate information from young children and takes the right decision in terms of the concepts that must be retaught and the pace of teaching that must be followed (Morrison, 2010). It is believed that the positive perceptions of primary mathematics teachers towards the use of weekly computerized tests to assess the knowledge and skills of primary school students may affect students' performance and attainment in the same.

In order for primary mathematics students to attain well in weekly computerized tests, their teachers need to understand how these tests support the process of teaching and learning. For this reason, it is important that primary mathematics teachers are provided with professional development opportunities to explore the techniques utilized in weekly computerized tests for putting questions and the strategies that need to be implemented in the classroom to help students in answering them.

This research shows the perceptions of primary mathematics teachers of weekly computerized tests. While the relationship between these perceptions and students' attainment is complex, this study confirms that it is of merit value to inspect how experienced mathematics teachers can work together to improve perceptions of new teachers in primary school mathematics. Improving teachers' perceptions will improve students' attainment and learning.

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## Appendix A

### The Questionnaire

#### Primary Math Teachers Perceptions toward Mathematics Weekly Computerized Test

*This questionnaire is part of a study I am conducting to examine mathematics teachers' perceptions about the weekly computer-based multiple choice exam as part of the requirements for my Master's degree in Curriculum and Instruction in the College of Education in the United Arab Emirates University. Your opinion is highly valued as it will help me gain insight into the weekly computer-based exam as an instructional practice, and it will enlighten me about how it can benefit both teachers and students. The information that will be collected will remain confidential and will only be used for the purposes of this study..*

#### DEMOGRAPHIC INFORMATION:

Years of Experience	Less than 5 years	5-10 years	More than 10 years
Education	Bachelor	Master	Other
Gender	Male	Female	
Number of working years as a teacher in this school	One year	More than two years	

Please tick (✓) the answer that best represents your view.

#### PART ONE:

	Mathematics Weekly Computerized Exam:	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
1	Should be developed by the relevant respective teachers					



2	Teachers should invigilate their corresponding students during the exam					
3	It gives teachers accurate data about the weekly taught concept					
4	Gives teachers chance to plan for following week according to the results					
5	Helps students to practice the essential concepts on weekly basis					
6	Makes the comparison between sections of the same grade fair					
7	Gives students chances to improve every week					
8	It allows teachers to measure the progress of their students every week					
9	Minimizes the chance of cheating					
10	Promotes free-exam oriented teaching					
11	Allows students to practice variety of questions with time allocation					
12	Gives an objective idea about the students' progress before doing their final exam					
13	Allows teachers to adjust their pace from year to year					
14	It is an objective tool to compare between teachers' efficient					
15	Puts a positive pressure on students					
16	Improves students' skills in handling the exams independently					
17	Teachers can justify students individuated mistakes					
18	Experienced teachers are aware of the common mistakes and accordingly can warn their students before the exam					
19	Experienced teachers can read and conclude the results of the weekly computerized exam more objectively than new teachers.					
20	Experienced teachers know the repeated questions from previous years and train their students on them					
21	Students of experienced teachers get higher results than new teachers in the weekly computerized exam.					
22	Experienced teachers are more positive toward weekly computerized exam					
23	New teachers feel more pressure when they compare their results with other teachers					
24	New teachers need intensive training on using the computerized exam					
25	New teachers' perceptions toward the weekly computerized exam affect their students results					

26	Doesn't help teachers to improve their skills in forming questions					
25	New teachers face more challenges in adjusting their pace in teaching according to the weekly results					
26	Students of experienced teachers get better results than students of new teachers					

**PART TWO: Computer-based exam vs. Paper/pencil Exam**

	<b>Views about Computer-based exam vs. paper/pencil exams as perceived by mathematics teachers.</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
1	Teachers should write the weekly paper/pencil weekly exam in order to assess their students weekly progress					
2	Using paper/pencil exams helps teachers spot their students mistakes.					
3	Using paper/pencil exams helps students practice answering questions in different ways by following mathematical steps.					
4	Using paper/pencil exams prevents students guessing final answers					
5	Using paper/pencil exams give students more chances to get sub-marks for each question					
6	Using paper/pencil exams takes longer time to be corrected					
7	Using paper/pencil exams makes students aware of the marking scheme/ procedure					
8	Using paper/pencil exams gives teachers accurate idea about students mistakes					
9	Using paper/pencil exams improves students scores					
10	During paper/pencil exams students might have chances to cheat					
11	Open ended questions with steps to solve, can be used only I paper/pencil exam.					
12	Marking paper/pencil exams takes long time from teacher					
13	Teachers can give individualized feedback for their students when using paper/pencil exam					
14	When using paper/pencil exams increases students motivation					
15	Teachers can control the time allocated for each question when using paper/pencil exam.					
16	Paper/pencil exams are difficult to be formed and checked on weekly basis					

## **Appendix B**

### **The Interview Questions**

#### **Weekly Computerized Tests Questions**

The study resolved around the following questions:

- 1) What are the primary mathematics teachers' perception toward weekly computerized tests?
- 2) What are the advantages of using the Mathematics Weekly Computerized Exams?
- 3) What are the dis-advantages of using the Mathematics Weekly Computerized Exams??
- 4) What would you prefer using, the Mathematics Weekly Computerized Exams or Paper-based exam? Why?
- 5) What are the difference, if any, between using computerized exam or paper/pencil exams as perceived by mathematics teachers?
- 6) What are the difference, if any, between experienced and new teachers in terms of using computerized exams to assess their students' knowledge?